

A TAXONOMIC REVISION OF THE GENUS *HUXLEYA* EWART (VERBENACEAE)*

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Abstract

A taxonomic revision of the monotypic genus *Huxleya* is presented and its affinities and distribution are considered. A detailed description of the type species, *H. linifolia*, is supplemented by a habit sketch of a flowering branch and analytical drawings of the flower.

Taxonomic History of the Genus

The genus *Huxleya* was described by Ewart (1912) with one species, *H. linifolia*, the type of which was collected by N. Holtze (No. 1322) from near Port Darwin in Northern Territory, Australia. It was considered nearest to the genus *Faradaya* F. Muell. but due to several distinct characters between these two genera Ewart (1912) proposed for *Huxleya* a new subtribe Oxereae in the tribe Viticeae. The new subtribe for the genus does not seem to have been accepted by any subsequent botanist. In 1917, Ewart & Davies referred the genus to subtribe Euviticeae in the tribe Viticeae. Later, Junell (1934) following Briquet's (1895) classification placed *Huxleya* in the subfamily ("Tribus") Viticoideae tribe ("subtribe") Clerodendreae. This classification was adopted by Moldenke (1959, 1971, 1981) and Bhoj-Raj (1983). The majority of botanists, however, have retained it in the Verbenaceae without reference to any subtribe, tribe or a subfamily. According to Burbidge (1963), *Huxleya* is an "an aberrant genus probably misplaced in this family" i.e. Verbenaceae. However, she did not elaborate further to suggest the correct family for it. The genus is presently classified in the tribe Clerodendreae subfamily Viticoideae in the Verbenaceae and is so far known only by the type species.

HUXLEYA Ewart

Huxleya Ewart in Ewart & B. Rees, Proc. Roy. Soc. Vic. 25 N.S. part 1 (1912) 109; Wangerin, Just's Bot. Jahresber. 40 (1914) 862; Ewart & Davies, Fl. N. Terr. (1917) 282; Fedde & Schuster, Just's Bot. Jahresber. 43 (1922) 158; Junell, Symb. Bot. Upsal. 4 (1934) 111, 203; Mold., Known Geogr. Distrib. Verbenac. edn 1 (1942) 69, 93; Alph. List. Inval. Names (1942) 27; Pl. Life 2 (1948) 34, 65; Known Geogr. Distrib. Verbenac. edn 2 (1949) 153, 186; Résumé Verbenac. etc. (1959) 411; N. Burb., Dict. Aust. Pl. Gen. (1963) 154; F. Barkley, List Ord. Fam. Anthoph. (1965) 76, 174; L.S. Smith, Contrib. Qld Herb. No. 6 (1969) 20; Mold., Fifth Summary Verbenac. etc. 2 (1971) 760; Baines, Aust. Pl. Gen. (1981) 190; Mold., Phytologia 48 (1981) 388; Bhoj-Raj, Rev. Palaeobot. Palynol. 39 (1983) 373.

Type species: H. linifolia Ewart & B. Rees, Proc. Roy. Soc. Vic. 25 (N.S.) part 1 (1912) 109.

Erect, procumbent or prostrate plants. Stem branched towards the base, tetragonal. *Leaves* simple, decussate or sub-opposite, exstipulate, elongate-linear or filiform. *Inflorescence* a reduced cyme comprising mostly an axillary solitary flower, sometimes up to 3 flowers in a cyme. *Flowers* rather large, pedicellate, with 2 bracteoles, almost actinomorphic, bisexual, hypogynous. *Calyx* of 5 fused sepals, persistent, inferior, campanulate, deeply 5-cleft. *Corolla* of

*The present treatment of the genus *Huxleya* is the ninth in the series of taxonomic revisions in the family Verbenaceae in Australia (See Munir, 1982, 1984a, 1984b, 1985, 1987a, 1987b, 1989, 1990).

5 fused petals, hypocrateriform; tube up to 30 mm long, uniformly narrow-cylindrical; lobes 5, equally spreading. *Stamens* 4, exserted, inserted in the corolla-tube, almost equal or rarely slightly didynamous, all fertile; filaments filiform; anthers dorsifixed, 2-lobed, lobes free in the lower half, longitudinally dehiscent. *Ovary* bicarpellary, syncarpous, apically distinctly 4-lobed, 4-locular with one anatropous ovule in each cell attached to an axile placenta at or above the middle; style terminal, exserted, filiform, glabrous, with shortly 2-lobed stigma. *Fruit* not seen.

Number of species: World 1; Australia 1

Derivation of name

The genus is named after Thomas Henry Huxley (1825-1895), famous English naturalist and author, friend and champion of Charles Darwin.

Distribution (Map 1)

The genus *Huxleya* is endemic to the northern tropics of Northern Territory in Australia.

Comments

According to Ewart & Rees (1912) and Moldenke (1981) the ovules are "attached to the side near the base" of the ovary in this taxon. During the present investigation, however, the ovules have been found attached to the placenta about the middle of the ovary.

So far, the fully developed fruit in *Huxleya* has not been recorded. By the shape of the mature ovary, however, one could conclude that the fruit in this genus is similar to that of *Clerodendrum* L. which is drupaceous.

In proposing a new subtribe Oxereae for the genus *Huxleya*, Ewart & Rees (1912) wrote that "this genus differs from *Faradaya*, the only other Australian genus of this sub-order, in having the calyx 5-lobed (instead of 2), 5-lobed corolla (instead of 4), equal stamens (not didynamous), ovary 2-lobed (not 4), in being an upright herb (not a woody climber), in the flowers solitary (instead of in terminal panicles). These distinctions are almost sufficient to make an additional subtribe" in the tribe Viticeae of the family Verbenaceae. The present author agrees with most of the above statement by Ewart & Rees (1912) except the number of ovary lobes which are 4 not 2.

No cytological investigation is known to have been done on the species in this genus.

Burbidge's (1963) remark that *Huxleya* is misplaced in the family is not borne out by this study. The species clearly belongs in the Verbenaceae although it is an unusual taxon.

Affinities

Huxleya is closely related to *Oxera* in its inflorescence being cymose, flowers more or less zygomorphic, ovary 4-lobed and fruit drupaceous but splitting into four 1-locular parts. Nevertheless, *Oxera* can easily be identified by its inflorescence being composed of corymb-like cymes, calyx usually 4- (rarely 5-) lobed or -toothed, corolla 4-fid or sometimes slightly bilabiate, fertile stamens 2. Moreover, *Oxera* is endemic to New Caledonia and *Huxleya* to Australia.

There are a few characters common between *Huxleya* and *Faradaya*. Both have cymose inflorescence, almost zygomorphic flowers, large, showy, with a long corolla-tube, 4 (exserted) stamens in each flower, 4-lobed ovary and drupaceous fruit. Nevertheless, *Huxleya* is easily distinguished by being an upright or procumbent herb (not climbing shrub or lianas), in having mostly the axillary solitary flower (instead of terminal or axillary corymbose thyse), the calyx 5-lobed (instead of 2), corolla 5-lobed (instead of 4) and stamens (i.e. filaments) almost equal (instead of didynamous). Moreover, *Huxleya* is endemic to Northern Territory in Australia while *Faradaya* is known to occur in East Malaysia (Sabah), Indonesia, Melanesia, Polynesia,

east to the Fiji and Samoan Islands, and south to the north-eastern tropics of Australia.

Huxleya linifolia Ewart & B. Rees, Proc. Roy. Soc. Vic. 25 N. S. 1 (1912) 109, t. 5; Ewart & Davies, Fl. N. Terr. (1917) 282; Fedde & Schuster, Just's Bot. Jahresber. 43 (1922) 159; Mold., Alph. List Inval. Names (1942) 27; Known Geogr. Distrib. Verbenac. edn 2 (1949) 153, 186; Résumé Verbenac. etc. (1959) 209, 301; L.S. Smith, Contrib. Qld Herb. 6 (1969) 20; Mold., Fifth Summary Verbenac. etc. 1 (1971) 346, 531; Chippendale, Proc. Linn. Soc. N.S.W. 96 (1972) 256; Mold., Phytologia 48 (1981) 389; Sixth Summary Verbenac. etc. (1980) 337; Bhoj-Raj, Rev. Palaeobot. Palynol. 39 (1983) 357, 373, 395; Dunlop, Checklist Vasc. Pl. N. Terr. (1987) 80; Lazarides et al., Checklist Fl. Kakadu Nat. Pk, N. Terr. No. 15 (1988) 26.

Lectotype: N. Holtze 1322, Port Darwin, Northern Australia, 1892 (MEL583548, lectotype designated here; MEL22383, isolectotype!).

Typification

H. linifolia is based on N. Holtze's collection no. 1322 from Port Darwin, comprising two sheets. As no holotype was designated by the authors a lectotype is chosen here. Both syntypes, preserved in Herb. MEL, were annotated and possibly used by the authors in preparing the protologue of this species. Of these, the one with MEL583548 is particularly complete and well preserved, so that it was selected here as the lectotype of this species.

Description (Fig. 1)

Erect or more often procumbent-prostrate perennial herb, (15-) 20-35 (-45) cm long. *Stem* tetragonal, grooved, glabrous, often branched near base, 1-3 mm diam. *Leaves* opposite or sometimes alternate towards base of stem, sessile, narrow-linear, acute, entire with slightly recurved margins, (10-) 15-60 (-80) mm long, 1-3 mm wide, glabrous, sometimes puberulous along margins and beneath, sparsely pitted with minute glands on lower surface. *Flowers* mostly solitary in axils of upper leaves, borne on a long stalk consisting of long peduncle and short pedicel between 2 minute bracteoles and calyx; stalk slender, glabrous (10-) 15-30 (-43) mm long; bracteoles (0.5-) 1-4 (-7) mm long. *Calyx* tubular below, 5-lobed above, 4-8 (-12) mm long, almost glabrous to sparsely puberulous outside, glabrous inside; lobes narrowly lanceolate, acute, 2-6 (-8) mm long, (0.5-) 1-2 mm wide at base; tube widened apically, 1-2 (-3) mm long, 1.5-2 mm diam. at top. *Corolla* white, hypocrateriform; tube narrow-cylindrical, (10-) 15-25 (-30) mm long, 1-2 mm diam., pubescent outside, villous inside; lobes elliptic-oblong to subobovate, glabrous, 6-10 (-15) mm long, 3-6 (-8) mm wide. *Stamens* exserted; filaments white, attached to throat of corolla-tube, filiform, glabrous, (3-) 4-6 mm long; anthers oblong, somewhat sagittate with a bluntly pointed tip, 1.5-2 mm long. *Ovary* globose, glabrous, apically 4-lobed, 1-2 mm diam.; style exserted, filiform, glabrous, 18-30 (-35) mm long; stigma deeply bifid. *Fruit* not seen.

Specimens examined

AUSTRALIA: NORTHERN TERRITORY: *Bowman* 6, Berry Springs, 10.v.1984 (DNA); *Burbidge* 5281, Berrimah Agricultural Research Farm near Darwin, 23.iv.1956 (CANB); *Byrnes* 1282, Howard Springs, 20.i.1969 (BRI, CANB, DNA, L, NSW, NT); *Byrnes* 2460, 37 km S Darwin, 13.i.1972 (CANB 2 spec., DNA, NT); *Byrnes* 2468, Mt Bunday Rd, 18.i.1972 (CANB, DNA, NT); *Craven & Whitbread* 8004, 80 km WNW Jabiru, Kakadu National Park, 21.iii.1981 (CANB); *Dunlop* 4667, Jabiru, 31.i.1978 (DNA); *Dunlop* 6793, Tabletop Range, 19.v.1985 (DNA); *Eddy* 5204, Elizabeth River near Darwin, 27.i.1958 (BRI, DNA, MEL, NSW); *Holtze* 795, Darwin area, undated (MEL); *Holtze* 1322, Port Darwin, 1892 (MEL583548 lectotype, MEL22383 isolectotype); *Holtze* 2028, loc. cit. 5.iv.1911 (NSW); *Lazarides* 7742, c. 9 km E Oenpelli Mission, 17.ii.1973 (BRI, CANB, DNA, K, L); *Muspratt* SSO 220, Elizabeth River flood plain, 22.i.1963 (DNA); *Muspratt* SSO 340, Elizabeth River flat, Noonamah, 25.i.1963 (DNA); *Rankin* 1204, Berry Springs near Goose Lagoon, 6.iv.1978 (DNA); *Rankin* 1709, Koolpinyah Sand Pit, Howard River, 17.i.1979 (CANB, DNA, K); *Robinson* R27, c. 10 km down Humpty Doo Rd, 18.iii.1964 (DNA); *St. John*



Fig. 1. *Huxleya linifolia* Ewart & Rees (A-H, N. Byrnes 1282: DNA). A, habit sketch of a flowering branch; B, enlarged portion of tetragonal stem; C, flower with two bracteoles; D, flower with calyx and corolla vertically cut open showing androecium and gynoecium; E, ovary; F, transverse section of ovary; G, stamen showing front view of dehiscent anther; H, stamen showing back view of anther.

24235, c. 36 km S Darwin, 24.xi.1950 (BISH); *Wightman* 231, near Holmes Jungle, 25.iii.1983 (DNA); *Wightman* 2550, Black Jungle, Darwin, 10.ii.1986 (BRI, CANB, DNA, PERTH).

Distribution and ecology (Map 1)

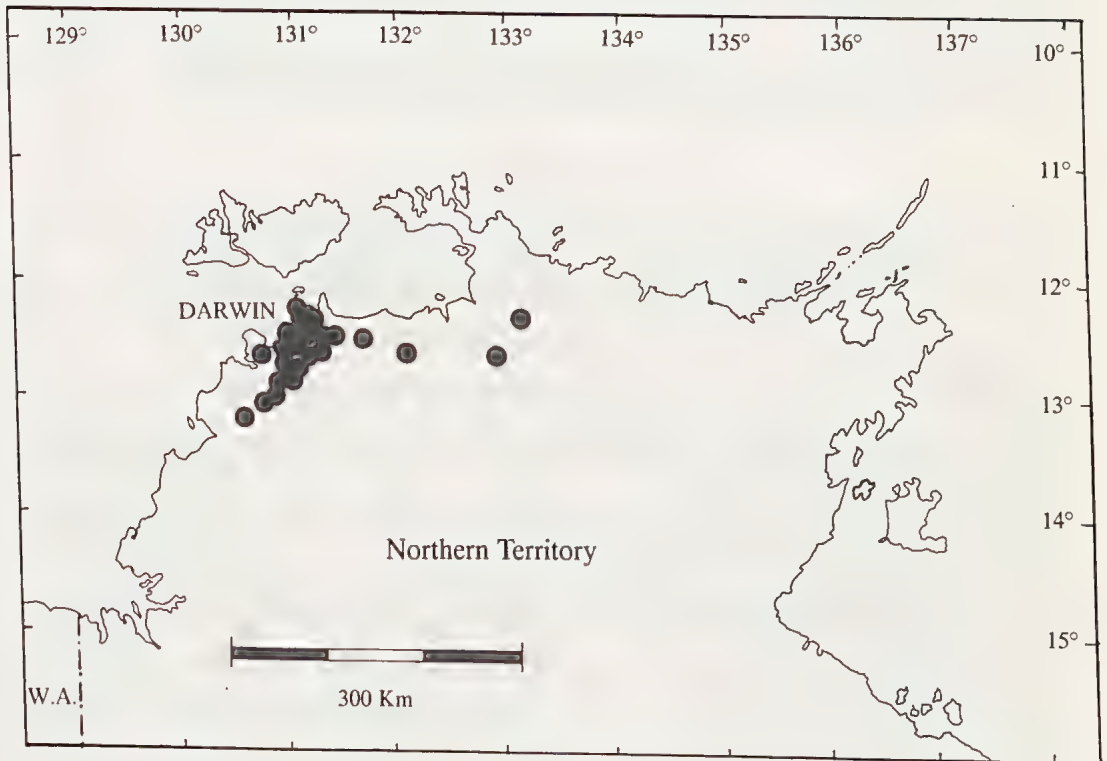
H. linifolia is endemic to northern part of Northern Territory where it has been recorded chiefly from Darwin region. The majority of localities are towards east and south of Darwin with a few collections from inside the Kakadu National Park. The eastern-most locality is near the township of Oenpelli and the most southerly one near Tabletop Range. The overall known distribution is between 12° and 14°S and between 130° and 134°E.

It has been recorded to grow on "seasonally swamp sandy soil" and on "sandy laterite soil". Also recorded from moist "woodland", "flood plain" and "on black to grey alluvial soil near creek".

Comments

The protologue of this taxon is based on one of Nicholas Holtze's collection (no. 1322) of 1892, describing the ovary as "2-celled, each cell containing one anatropous ovule attached to the side near the base". A later collection of this species by N. Holtze (no. 2028) from the type locality, gathered in 1911, has a hand-written note and drawing of ovary which describe the ovary as "4-celled" with "one ovule in each cell". The latter description seems to conform with the present studies in the species.

Ewart & Rees (1912) and Moldenke (1981) described this species as "an erect herbaceous plant". According to most collectors' field notes, however, it is a prostrate or procumbent herb growing in "seasonally flooded" or "marshy sandy soil". According to present studies, this species does have an erect habit but is more often prostrate or procumbent.



Map 1. Distribution of the genus *Huxleya* Ewart.

Moldenke (1981) cited literature references and noted some information about the genus and its only species, but like Junell (1934), he too did not see any authentic material of this apparently rare species.

In this taxon, the calyx-lobes are mostly about double the length of calyx-tube while the corolla-lobes are almost half the length of its corolla-tube.

The axillary, usually solitary flowers are borne on a long slender stalk with two minute bracteoles a short distance below the calyx. The part of flower-stalk between calyx and bracteoles is a pedicel, the rest being a peduncle of a single-flowered inflorescence. The bracteoles are generally not easily visible to the naked eye, therefore, pedicel and peduncle of each flower are here treated here as a flower-stalk. Because of very small size and caducous nature of bracteoles, Ewart & Rees (1912) and Moldenke (1981) recorded the flowers "without bracteoles".

In their publications, Ewart & Rees (1912) and Moldenke (1981) described the stigma "reaching to the opening of the corolla-tube", but present observations show that the stamens and style generally protrude well beyond the rim of the corolla-tube. Their observations have been due to the scarcity of flowering material, as Ewart & Rees (1912) saw only the two type specimens and Moldenke (1981) saw no authentic material at all. Moldenke's entire discussion on this taxon seems to be based on previously published works, particularly the protologue of this species.

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